Experimentation

April 2010

TEMAC T&E Refresher Course

Purpose

Understand the key interfaces and interactions between Test & Evaluation (T&E) and Experimentation events that enable a more efficient and effective materiel acquisition program.

Definitions

- **Experiment – An analytical activity, founded upon observation or experience derived from unbiased trials conducted under controlled conditions within a representative environment, to discover something unknown, to test or validate a hypothesis, or establish or demonstrate some knowledge within a specific context; the results of an experiment are reproducible and provide defensible analytic evidence.** *

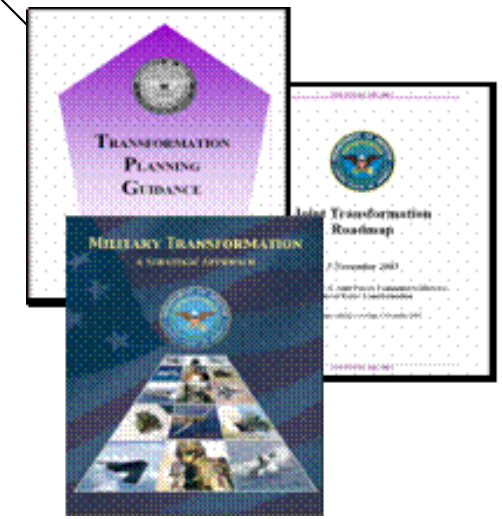
- **Test & Evaluation - A process which produces an evaluation of qualitative and quantitative data regarding systems capabilities and limitations for the acquisition community. This information is used for fielding decisions as well as for use in improving system performance. The user community utilizes the information to develop or revise doctrine and TTPs related to that specific system or system of systems.** *

- **DA Directive 2009-04 – Army Experimentation Program (AEP) (pending SecArmy signature)**
- **Definition of Test & Evaluation from the DAU Glossary of Defense Acquisition Acronyms & Terms**

A Contrast of Event Types

	Event Type		
	Experiments		**T&E**
Purpose	**Discovery** **Hypotheses testing** **Demonstration** **Learning and Risk Reduction**		**Learn, Measure, Demonstrate, and Risk Reduction**
Conditions	**Unbiased trials** **Free-play and Two-sided** **Reproducible** **Under the right conditions – may share common venues**		**Controlled to ensure data collection** **Repeatable / Free Play**
Outcome	**Not Predetermined** **Results may inform other activities (feedback loops)**		**Measures of Effectiveness /**

Guidance



ArCP

Annual Experiment Guidance

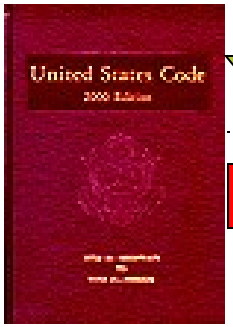
Proponent is TRADOC ARCIC

Army Campaign Plan

AR350-28

ARFORGEN Planning Process

Proponent is HQDA, G-3/5/7 Training



DODD 5000.1

DODD 3200.11

DODI 5000.2

Defence Aquisition Guidebook

AR73-1

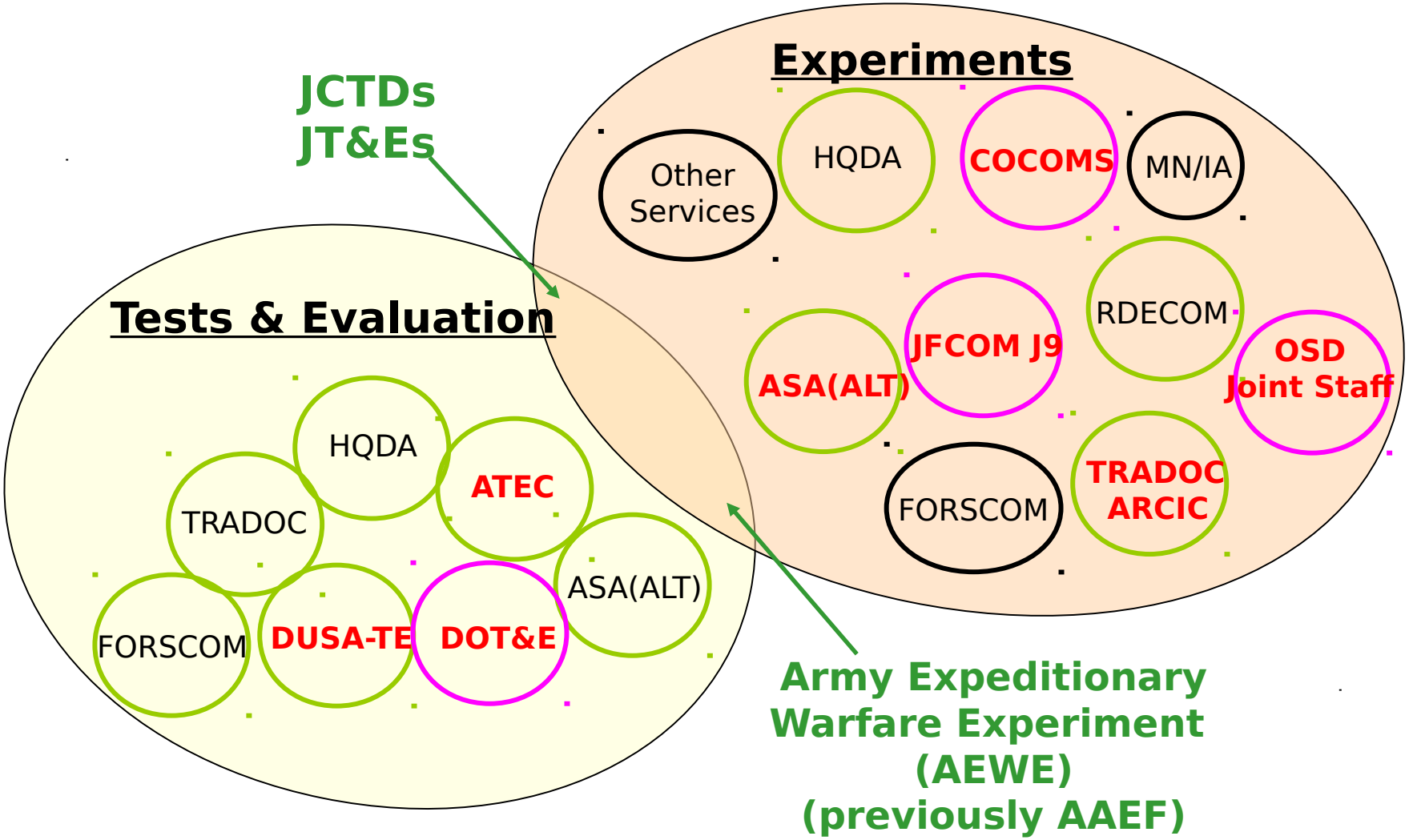
Proponent is OSD & HQDA

KNOWLEDGE

JCIDS

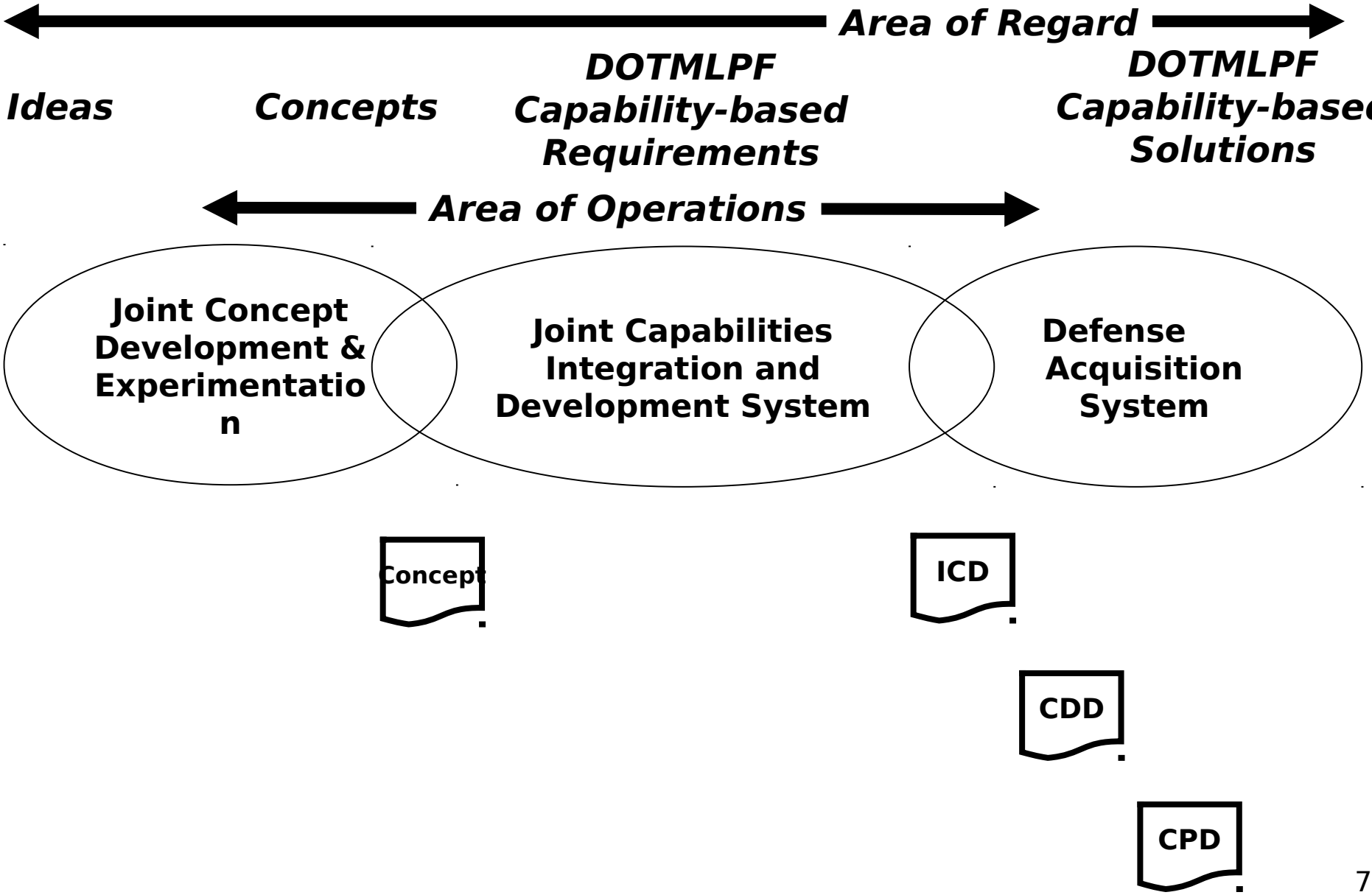
ACQUISITION

The Key Players

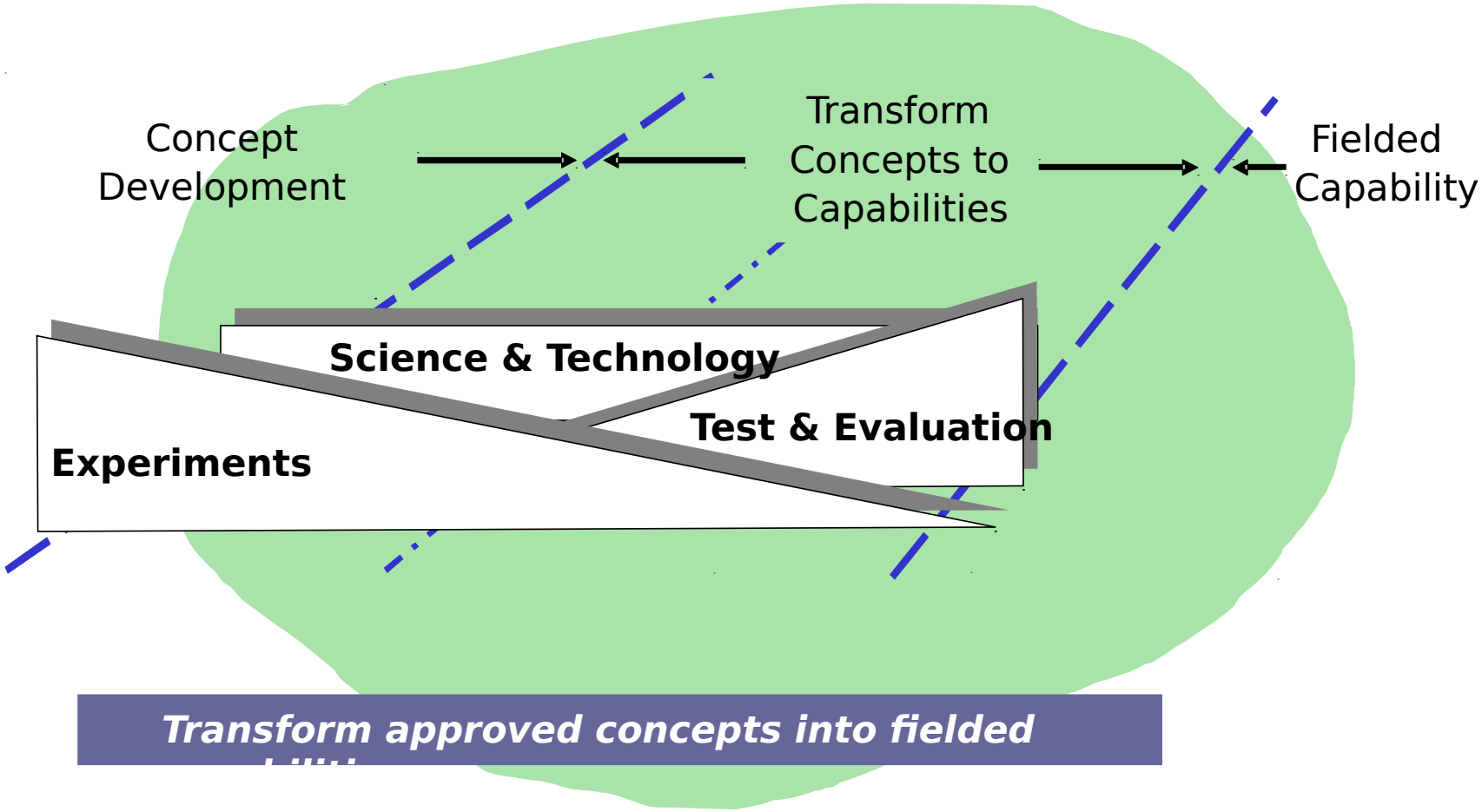


Note: Primary Drivers in Red Font

The Big Picture



Interfaces



Transform approved concepts into fielded

Experimentation – Test & Evaluation

- The lead organization has to work upfront with the other participating organizations to insert scenarios, specific test requirements, etc.
- Most experiments require M&S support as do T&E events. The event design will determine the M&S requirements.
- Data collection must be less intrusive in experiments.

T&E	Experiments
Major Acquisition Decision	Informs Concept & Technology Development
Official Requirements Process	Mitigates Risk for Capability Development
Entrance/Exit Criteria	Enables Development from Beginning to End
Certified M&S are Mandated	Approved DPS are Mandated
Primarily Objective Data	Derived from Observations & Experience

Adjustments are Necessary by All Key Players in Order for the 'Event' to be Successful

T&E and Experimentation Examples

- **Omni Fusion**
- **Army Expeditionary Warfare Experiment (AEWE)**
- **FCS Experiments**

Omni Fusion (OF) 2009

- **OF 09 was a campaign of experimentation designed to answer critical questions about the development and approval of future concepts for the Army Future Modular Force (FMF) of 2015-2024. OF 09 informs the Future Modular Division design and Battle Command Concept, and development of Special Operations Force (SOF) concepts.**

- **MOEs: The overall analytic methodology for this experiment utilized a building block approach to inform the experimental objectives and issues. Key Essential Elements of Analysis included:**
- **In what ways should battle command functional concepts employed by a future modular division be modified to better enable friendly forces to decide and act before an adversary can or react?**
- **What battle command concepts require revision to enable the future modular division headquarters to better integrate with Joint, Interagency, Intergovernmental, and Multinational (JIIM) structures during full spectrum operations?**
- **How is the staff's ability to manage full spectrum operation influenced by the human dimension factors involved in using the Battle Command System (BCS)?**
- **What elements of the human dimension influence the staff's ability to integrate terrestrial, aerial, and space based assets into the network transport system to enable situational understanding (SA)?**

- **Specific outcomes, impacts, or recommendations: The final report is not yet complete, however the following are emerging lessons learned:**
- **Critical need to interface US and MN airspace info systems with the Joint Air Ground Integrating Cell (JAGIC) .**
- **Common Operational Picture alone was not sufficient for timely personnel recovery operation coordination.**
- **Establishing Info Engagement Working Group (IEWG) facilitates coordination, synchronization, and de-confliction.**
- **Air Missile Defense (AMD) Section/Cell may be better placed within the JAGIC.**
- **BCS provides an enormous amount of info, better organization of the info is necessary to maximize SA.**

Army Expeditionary Warfare Experiment (AEWE)

(previously AAEF – Air Assault Expeditionary Force Experiment)

- **Continued experimentation with emerging technologies in a live field environment in order to inform FCS:**
  - **– Provided DOTMLPF insights to assist in FCS risk reduction decisions.**
  - **– Refined the User Functional Description (UFD) for FCS Battle Command.**
- **Provided a live venue to identify promising technology candidates from Spiral to the current force.**
- **Assessed and documented the impact of emerging C4ISR (and other technologies) and tactical vertical maneuver concepts on the lethality and survivability of a small modular combat unit.**
- **Explored the C4ISR challenges and requirements of employing an FCS-like network.**
- **Refined capability requirements for a network-enabled force to dominate its battlespace. Identified capability gaps.**
- **Addressed employment of sensors and sensor management at the small unit level.**

FCS Experiments (data source for follow-on

FCS Exp 1.1

• Objective – Core Program network and SO1 risk reduction, and early hands-on feedback from Soldiers
- Engineering (material) risk reduction
- Early input into DOTLPF

• 5 Key Objective Areas
- Network communications (JTRS GMR QoS)
- Distributed Fusion Management (DFM)
- FCS interoperability (ABCS, DCGS-A and USMC)
- Information assurance (PKI/CDG/IDS)

FCS Exp 2.1

• Objective – Joint/Multi-National Net-Centric Information Exchanges, Interoperability

Risk Reduction, WIN-T discovery

FCS Exp 2.2

• Objective - Critical Technology Simulations, Lab integration, early discovery B2E capabilities

Joint Precision Air Drop System (JPADS) JCTD (Transition to a POR)

This JCTD transitioned to an official program of record and is currently undergoing developmental and operational testing

Summary

- **Experiments can be important preparatory activities for T&E.**
  - **Potential data source to support system assessment / evaluation**
  - **Increase tester knowledge**
  - **Eliminate hazards through design selection**

- **Experiments are rigorous analytic events that capture data that is evaluated using established metrics developed during the design of the event. These events can provide data for T&E so as to:**
  - **Save resources (time and funds)**
  - **Provide benchmark for measuring maturity of system**
  - **Provide insight into HFE, RAM and ILS (Maintenance and training) parameters**
  - **Support DOTMLPF development**

Acknowledgement & Feedback

This module is a part of the T&E Managers Committee (TEMAC) T&E Refresher Course.

Request your feedback. Please contact -

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